Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently amended) A method of incorporating physics simulation data into a game running on a host, wherein the host comprises a memory, a peripheral, and a Physics Processing Unit (PPU) operatively connected to a Central Processing Unit (CPU), the method comprising:

running a main game program on the host;

calling a PPU driver from the main game program;

by means of the PPU driver, initiating operation of the PPU to calculate the physics simulation data.

2. (Currently amended) The method of claim 1, further comprising:
communicating the physics simulation data from the PPU to the host.

3. (Original) The method of claim 1, further comprising:
storing the PPU driver in the host.

4. (Currently amended) The method of claim 2, wherein the physics simulation data is communicated from the PPU to the host via at least one physical interface selected from a group of physical interfaces consisting of: USB, USB2, Firewire, PCI, PCI-X, PCI-Express, and Ethernet.

5. (Currently amended) The method of claim 1, wherein the PPU comprises;

an internal PPU memory;

a Program Control Engine (PCE) controlling operation of the PPU and managing communication with the host;

a Data Movement Engine (DME) performing data movement operations; and,

a Floating Point Engine (FPE) performing data calculations adapted to generate the physics simulation data; and wherein the method further comprises:

communicating a command from the PCE to the DME;

in response to the command, moving data from an external memory and storing the data in the internal PPU memory.

6. (Original) The method of claim 5, further comprising:

allowing the FPE access to the data stored in the internal PPU memory.

7. (Currently amended) The method of claim 6, wherein the internal PPU memory comprises multiple banks, and wherein steps of moving data from the external memory to the internal PPU memory and allowing the FPE access to the data moved into the internal PPU memory comprise steps in a multi-threading data computation ~~ultra-threading~~ technique.

8. (Original) The method of claim 1, wherein the host further comprises a Graphics Processing Unit (GPU), and the method further comprises:

storing a game engine in the host;

storing an effects engine in the host;

wherein the PPU driver is callable by at least one of the main game program, the game engine, and the effects engine.

9. (Original) The method of claim 8, wherein the operation of the PPU is initiated only by means of the PPU driver.

10. (Currently amended) A method, comprising:

executing a main game program on a host comprising a Central Processing Unit (CPU) and a Physics Processing Unit (PPU);

calling a PPU driver from the main game program;

initiating operation of the PPU through the PPU driver; and,

calculating physics simulation data in the PPU.

11. (Currently amended) The method of claim 10, further comprising:
communicating the physics simulation data from the PPU to the CPU.

12. (Currently amended) The method of claim 11, wherein physics simulation data is communicated from the PPU to the CPU according to a protocol selected from a group of data communication protocols defined in relation to USB, USB2, Firewire, PCI, PCI-X, PCI-Express, and Ethernet.

13. (Original) The method of claim 10, further comprising:
executing a game engine routine on the host; and,
calling the PPU driver from the game engine routine.

14. (Original) The method of claim 10, wherein the host further comprises a Graphics Processing Unit (GPU), and the method further comprises:
executing an effects engine routine associated with the GPU; and
calling the PPU driver from the effects engine routine.

15. (Currently amended) A method for use on a host comprising a Central Processing Unit (CPU) and a Physics Processing Unit (PPU), the method comprising:
executing a main game program on the CPU;
during the execution of the main game program, making a request for physics simulation data; and,
in response to the request, initiating operation of the PPU to calculate the physics simulation data.

16. (Original) The method of claim 15, wherein initiating operation of the PPU comprises:
moving data from an external memory and storing the data in a memory internal to the PPU.

17. (Original) The method of claim 16, further comprising:

executing multiple, parallel floating point operations on the data stored in the internal memory.

18. (Original) The method of claim 17, wherein the execution of multiple, floating point operations comprises a multi-thread operation.

19. (Currently amended) The method of claim 17, wherein the PPU comprises a Processing Control Engine (PCE) controlling operation of the PPU, and wherein making a request for physics simulation data further comprises:

communicating a command packet from the host to the PCE.

20. (Currently amended) The method of claim 19, wherein the PPU further comprises a Data Movement Engine (DME) and a Floating Point Engine (FPE) and wherein the method further comprises:

in response to the command packet, communicating an instruction from the PCE to the DME and storing data from the external memory in the internal memory; and,

generating the requested physics simulation data in the FPE by executing multiple, parallel floating point operations on the data stored in the internal memory.

21. (Currently amended) The method of claim 20, further comprising:

communicating the requested physics simulation data from the PPU to the host in response to the command packet.

22. (Currently amended) The method of claim 21, wherein the requested physics simulation data is communicated from the PPU to the host via at least one physical interface selected from a group of physical interfaces consisting of: USB, USB2, Firewire, PCI, PCI-X, PCI-Express, and Ethernet.

23. (Currently amended) A method of implementing a system capable of generating large quantities of physics simulation data for the purpose of constructing a

physically realistic animation within the context of a game program, the method comprising:

providing a hardware platform adapted to run the game program, the hardware platform comprising at least a memory and a general purpose microprocessor; and,

providing a dedicated, hardware based Physics Processing Unit (PPU) adapted to generate the physics simulation data.

24. (Original) The method of claim 23, wherein the step of providing a dedicated, hardware based PPU further comprises:

connecting an expansion board comprising the PPU within the hardware platform.

25. (Original) The method of claim 23, wherein the step of providing a dedicated, hardware based PPU further comprises:

providing a physical data communication path between the general purpose microprocessor and the PPU within the hardware platform.

26. (Original) The method of claim 23, further comprising:

providing a dedicated, hardware based Graphics Processing Unit (GPU) adapted to generate graphics data for use within the context of the game program.

27. (Original) The method of claim 26, wherein the step of providing a dedicated, hardware based PPU further comprises connecting a first expansion board comprising the PPU within the hardware platform; and,

wherein the step of providing a dedicated, hardware based GPU further comprises connecting a second expansion board comprising the GPU within the hardware platform.

28. (Original) The method of claim 26, wherein the step of providing a dedicated, hardware based PPU and the step of providing a dedicated, hardware based GPU are both accomplished by connecting a single expansion board comprising the PPU and GPU within the hardware platform.

29. (Original) The method of claim 28, wherein the PPU and GPU are capable of communicating data across a physical connection on the single expansion card.

30. (New) The method of claim 24, wherein the expansion board is an AGP or a PCI-Express board.

31. (New) The method of claim 28, wherein the expansion board is an AGP or a PCI-Express board.

32. (New) The method of claim 1, wherein the physics simulation data comprises data associated with at least one of; a rigid body contact, a rigid body collision, and rigid body dynamics.

33. (New) The method of claim 1, wherein the physics simulation data comprises data associated with a collision detection.

34. (New) The method of claim 1, wherein the physics simulation data comprises data associated with at least one of; simulated physical forces, simulated physical constraints, and state vectors.

35. (New) The method of claim 1, wherein the physics simulation data comprises data associated with a simulated particle mesh related to at least one of animated cloth, smoke, water, fog and fire.

36. (New) The method of claim 10, wherein the physics simulation data comprises data associated with at least one of; a rigid body contact, a rigid body collision, and rigid body dynamics.

37. (New) The method of claim 10, wherein the physics simulation data comprises data associated with a collision detection.

38. (New) The method of claim 10, wherein the physics simulation data comprises data associated with at least one of; simulated physical forces, simulated physical constraints, and state vectors.

39. (New) The method of claim 10, wherein the physics simulation data comprises data associated with a simulated particle mesh related to at least one of animated cloth, smoke, water, fog and fire.